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# Feeding lambs

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# FEEDING LAMBS.

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For the purpose of determining the effect of different rations in feeding lambs, an experiment was conducted extending over a period of 121 days—December 1, 1891, to April 1, 1892. The lambs used were four pairs of twins. One pair was said to be full blooded Hampshires and the others were of mixed Cotswold and Down blood. All of them were selected from a large flock owned in the vicinity of the College and were taken from the ewes in the latter part of September, and given a light grain ration on good clover pasture until put into the experiment, December 1st. October 22d, the pair of Hampshires sheared 3¼ pounds each of clean bright wool. Among the different pairs there was considerable variation in size, as will be seen by reference to the weights, but the individuals of each pair selected were as nearly alike as could be secured.

Three pairs, numbers 175 and 176, 177 and 178, and 179 and 180, all ewes, were divided into two lots, as follows: Lot I, 175, 178 and 179; Lot II, 176, 177 and 180. Numbers 175 and 176 were the Hampshires. Lot I weighed at the beginning of the experiment 211 pounds, and Lot II 207.

Lot III consisted of a pair of twin wethers, 181 and 182. They were of practically the same blood and were in all respects very much like the other grade lambs. Each lot had separate apartments in a sheep barn, affording good quarters for feeding, and all were given a few hours in a small open lot, for exercise, about every alternate day. The building admitted sunlight and was well ventilated. Water was given twice a day, and salt was kept where accessible all the the time. In feeding grain and hay each lot had all that it would clean up, morning and evening. All feed was carefully weighed and all grain left was weighed back at once. Weighing of the lambs was always done at the same hour and under the same conditions. Lot I was fed as shown in the following table. The weights and gain for each month is also presented:

## Lot I, Nos. 175, 178, 179.

| | Oats, pounds per month. | Oil meal, pounds per month. | Bran, pounds per month. | Hay, pounds per month. | Weights at end of each month. | | | Total weights at end of each mo. | Total gain at end of each month. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | No. 175 | No. 178 | No. 179 | | |
| November ... | ..... | ..... | ..... | ..... | 85 | 75 | 51 | 211 | ..... |
| December.... | 62 | 15 | ..... | 151 | 91 | 84 | 54 | 229 | 18 |
| January..... | 61½ | 18½ | 6 | 142 | 98 | 86 | 53 | 237 | 8 |
| February .... | 58 | 29 | 14½ | 111 | 110 | 98 | 57 | 265 | 28 |
| March .. .... | 62 | 31 | 15½ | 138 | 123 | 103 | 60 | 286 | 21 |
| Totals ..... | 243½ | 93½ | 36 | 542 | ..... | ..... | ..... | ..... | 75 |

The expense of this ration may be estimated at—

| | | |
|---|---|---|
| 243.5 lbs. | oats at 25½c per bu | $1.94 |
| 93.5 lbs. | oil meal at $25 per ton | 1.16 |
| 26 lbs. | bran at $16, per ton | .20 |
| 542 lbs. | hay at $5 per ton | 1.35 |
| Total | | $4.65 |

One pound of gain required 4.84 lbs. grain at a cost of 4.4 cents.

Total cost of feed for one pound of gain 6.2 cents.

Nutritive ratio of grain ration.....1 to 5
Nutritive ratio of entire ration.....1 to 6.5

The hay fed was the same to each lot and consisted of medium quality upland clover, timothy and blue grass, mixed. The nutritive ratio of the hay was estimated at 1 to 7.5. The straw fed to Lot II was fairly good oats straw. The following is the record of feeding and weighing of the lot.

## Lot II, Nos. 176, 177, 180.

| | Shelled corn, pounds per month. | Hay, pounds per month. | Straw, pounds per month. | Weights at end of each month | | | Total weights at end of each month. | Total gain at end of each month. |
|---|---|---|---|---|---|---|---|---|
| | | | | No. 176 | No. 177 | No. 180 | | |
| November | ..... | ..... | .... | 69 | 82 | 56 | 207 | .... |
| December | 82½ | ..... | 67 | 70 | 74 | 57 | 201 | −6 |
| January | 97¾ | ..... | 93 | 73 | 84 | 62 | 219 | 18 |
| February | 74 | 128 | .... | 78 | 92 | 60 | 230 | 11 |
| March | 92 | 136½ | .... | 83 | 100 | 64 | 247 | 17 |
| Totals | 346¼ | 264½ | 130 | ..... | ..... | ..... | ..... | 40 |

The expense of this ration is estimated at:

| | |
|---|---|
| 346¼ lbs. corn 30c per bu | $1.49 |
| 130 lbs. oat straw $2 per ton | .13 |
| 264 lbs. hay $5 per ton | .66 |
| Total | $2.28 |

One pound of gain required 8.05 pounds of grain at a cost of 3.7 cents.

Total cost of feed for one pound of gain 5.7 cents.

| | |
|---|---|
| Nutritive ratio of grain ration | 1 to 8.6 |
| Nutritive ratio of entire ration | 1 to 11.9 |

The feed and weights of Lot III were as follows:

## Lot III, Nos 181 and 182.

| | Oats, pounds per month. | Shelled corn, pounds per month. | Bran, pounds per month. | Oil meal, pounds per month. | Hay, pounds per month. | Weights at end of each month. | | Total weights at end of each month. | Total gain at end of each month. |
|---|---|---|---|---|---|---|---|---|---|
| November | ..... | ..... | ..... | ..... | ..... | 75 | 60 | 135 | ..... |
| December | 15½ | 24½ | ..... | ..... | 150 | 76 | 68 | 144 | 9 |
| January | 15½ | 24½ | 4 | 4½ | 105 | 76 | 69 | 145 | 1 |
| February | 14½ | 21¾ | 7¼ | 7¼ | 60 | 85 | 76 | 161 | 16 |
| March | 15½ | 24¼ | 7¾ | 7¾ | 78 | 89 | 86 | 175 | 14 |
| Totals | 61 | 95 | 19 | 19½ | 393 | ..... | ..... | ..... | 40 |

The expense of this ration at the same rate is:

| | |
|---|---|
| 61 lbs. oats at 25½c per bu | $ .48 |
| 96 lbs. corn at 30c per bu | .40 |
| 19 lbs. bran at $16 per ton | .15 |
| 19½ lbs. oil meal at $25 per ton | .24 |
| 393 lbs. hay at $5 per ton | .99 |
| Total | $2.26 |

One pound of gain required 4.8 pounds of grain at a cost of 3.1 cents.

Total cost for one pound of gain, 5.6 cents.

| | |
|---|---|
| Nutritive ratio of grain ration | 1 to 6.8 |
| Nutritive ratio of entire ration | 1 to 7.2 |

Lot I gained 75 pounds, Lot II 40 pounds, and Lot III (two lambs) 40 pounds. The ration of Lot I. was a narrow ration, having a narrower nutritive ratio than is ordinarily fed, and perhaps narrower than it is profitable to feed in using our common grain crops. Lot II had a wide ration although not uncommonly wide, being narrower than is furnished by the use of common field-cured corn fodder with corn. Many animals are grown and fattened, except while on pasture, on rations containing no greater proportion of nitrogenous matter than this.

By a narrow ration is understood one of a narrow ratio of digestible albuminoids to digestible carbhydrates, and a wide one, the reverse. In reporting this experiment the terms narrow and nitrogenous, and wide and carbonaceous as applied to rations are used as synonomous.

In comparing results obtained from these rations we notice first that it took 4.84 pounds of grain in the one case and 8.65 pounds in the other to produce a pound of gain, but that the 4.84 pounds cost 4.4 cents while the cost of the 8.65 pounds was but 3.7 cents. The relative value of the feeding stuffs is always an important consideration. The gain made on the wide ration was made at less cost than the other, although it required nearly twice as many pounds of grain. In fattening animals an economical gain is perhaps the greatest consideration, but in feeding young stock there are other points of equal importance. One of the instructive features of this experiment was the fact that the corn fed lambs made

no apparent growth. The gain in weight seemed to be the result of fattening instead of growing. This was especially noticeable in the pair of Hampshire twins. The one in the narrow ration lot made an unusually good growth while the other fattened well but seemed to make no growth whatever. It should be noted that the former was the larger and more growthy lamb at the beginning of the experiment and would likely have made more growth than the other under equal conditions. The reverse, however, was true of both of the other pairs of lambs in this group. Numbers 177 and 178 were twins. No. 177 weighed 82 pounds and went into Lot II. No. 178 weighed 75 pounds and went into Lot I. The former gained 18 pounds and the latter 28 pounds. Numbers 179 and 180 showed similar results, as will be seen by reference to the table. The two Hampshire lambs that sheared 3¼ pounds each in October, were sheared again April 1st. No. 175 (Lot I) sheared 4 pounds, and No. 176 (Lot II) 3 pounds. There was no appreciable difference in the market value of the wool. Microscopic measurements of samples taken from both clippings revealed some differences which will be made the subject of further investigation. On being cut up after killing lamb 176 showed thicker cuts of mutton with a little more fat than 175. The flesh of the nitrogenous fed lambs (Lot I) was rather more juicy and tender than that of the corn-fed lot. Aside from these points the slaughtering revealed no material difference. Less difference was seen in the quality of the mutton than in the appearance and growth of the animals before killing. Each of the lambs in Lot I had three-fourths of a pound of oil meal per day. Heavy oil meal feeding is considered unfavorable to the production of good meat, but no injurious effect could be detected in this case.

Lot III had a ration affording a greater variety of grain than either of the others. It will be seen that oats and corn constituted the greater portion of this ration, with bran and oil meal as supplementary. The nutritive ratio was a medium one, and may be duplicated at moderate expense by the use of clover hay and the ordinary gain crops of an Iowa farm. This ration gave the cheapest grain and on the whole the most satisfactory results although the gain was less than

that of the lambs on the narrow ration. The lambs in this lot made a satisfactory growth and improvement in flesh. The nitrogenous feed gave the greatest gain and growth, but more was consumed and on account of the higher commercial values of this class of feed the gain made was produced at a relatively greater expense.

The ration of Lot II was much the cheapest but the results must be regarded the most unsatisfactory unless fattening alone be considered. The lambs fed on nitrogenous and balanced rations (Lots I and III) showed a striking superiority in both growth and development over those fed on corn.

Lot II made no gain during the first month. The change from clover pasture and a balanced, though small, grain ration (about one-half pound per day) will perhaps account for this. Lot III made practically no gain during the second month. This result can only be accounted for by attributing to a severe fright from some boy and dog visitors. We think the gains made during the experiment by all lots were, to some extent interfered with by this circumstance as it was impossible to get the lambs to feed as quietly afterwards. There was perhaps no material change in the relative effects of rations, but the careful feeder knows that a disturbance of this kind is fatal to the best results.

## Summary of Results.

Gain was made on lambs with a ration of oats, oil meal and bran at the rate of one pound of increase for 4.84 pounds of grain, and a cost of 4.4 cents per pound for grain, and 6.2 cents, including hay. Nutritive ratio of grain, 1 to 5; entire ration, 1 to 6.5.

Gain was made with a ration of shelled corn at the rate of one pound of increase for 8.65 pounds of corn, and a cost of 3.7 cents per pound for corn, and 5.7 cents including hay and straw. Nutritive ratio of grain 1 to 8:6; entire ration 1 to 11.9.

Gain was made with a ration of shelled corn and oats as the basis, supplemented with bran and oil meal, at the rate of one pound of increase for 4.8 pounds of grain, and a cost of 3.1 cents per pound for grain, and 5.6 cents, including hay, Nutritive ratio of grain, 1 to 6.8; entire ration, 1 to 7.2.

The indications from this experiment are:

1. That a nitrogenous ration gave greater gain and growth than a carbonaceous ration, though at greater expense.

2. That a medium ration (about 1 to 7) gave more satisfactory results, all things considered, than either a nitrogenous or a carbonaceons ration.

3. That the gain made on a grain ration of corn alone, seemed to result from gain of flesh, and was not accompanied by any observable growth of frame.

4. That a nitrogenous ration produced an increase of wool over the carbonaceous ration, proportionate with the increased growth of the animal,

5. That oil meal feeding at the rate of three-fourths of a pound per day to lambs did not result in any depreciation in the quality of the mutton produced, but that lambs fed in this way made better mutton than those fed on corn alone.